

WHAT IS CLAIMED IS:

*bk BD X*  
1. A demolition equipment system comprising:  
a plurality of equipment bases, each equipment  
base forming at least a part of a distinct demolition  
equipment unit; and

5 a plurality of claw tines, each claw tine  
selectively, removably attached to each equipment base for  
forming a part of each distinct demolition equipment unit  
and movable between an open and closed position.

2. The demolition equipment system of claim 1  
wherein the plurality of equipment bases includes at least  
one bucket and at least one grapple base.

3. The demolition equipment system of claim 2  
wherein at least one grapple base is a two-tine grapple  
having a pair of claw tines opposed to each other and  
positioned 180 degrees from each other.

4. The demolition equipment system of claim 2  
wherein at least one grapple base is a three-tine grapple  
including three of the claw tines directed toward each  
other and positioned approximately 120 degrees apart from  
5 each other.

5. The demolition equipment system of claim 2  
wherein at least one grapple base is a four-tine grapple  
base including four of the claw tines directed toward each  
other with each claw tine positioned 90 degrees apart from  
5 two adjacent claw tines.

6. The demolition equipment system of claim 1  
wherein at least one demolition equipment unit utilizes at  
least a pair of spaced, parallel claw tines coupled  
together to form a claw structure.

7. The demolition equipment system of claim 6 wherein the claw structure includes an end member extending between and attached to the spaced claw tines forming the tips of the claw tines.

8. The demolition equipment system of claim 1 wherein a claw structure of at least one demolition equipment unit includes a grid assembly removably connected to at least one spaced claw tine.

9. The demolition equipment system of claim 1 wherein each claw tine includes an elongated claw tine body pivotally movable about a pivot point between the open position and the closed position, and a hydraulic cylinder for moving the claw tine body between the open position and the closed position, the hydraulic cylinder having a fixed end secured to a base and a cylinder rod end secured to the claw tine body, wherein the ratio of the length of the hydraulic cylinder when the claw tine body is in the closed position to the distance between the pivot point and the position where the cylinder rod end of the hydraulic cylinder is secured to the claw tine body is in the range of between 0.7 and 0.9.

10. The demolition equipment system of claim 1 wherein each claw tine includes an elongated claw tine body pivotally movable about a pivot point between the open position and the closed position, a hydraulic cylinder for moving the claw tine body between the open and the closed position, a support frame for securing the claw tine to the demolition equipment unit, the support frame including a cylindrical bushing member defining a pivot point for the claw tine body, and at least one support frame plate attached to the bushing member, a locking pin aperture formed in the support frame plate for securing the support frame to the demolition equipment unit and a securing pin aperture formed in the support frame plate for securing a fixed end of the hydraulic cylinder to the support frame,

and a support frame receiver attached to the demolition equipment unit, the support frame receiver formed as a single plate having an opening therein for supporting the bushing member and a locking pin aperture aligned with the locking pin aperture of the support frame for securing the support frame to the demolition equipment unit.

11. A claw tine for demolition equipment comprising:

an elongated claw tine body pivotally movable about a pivot point between an open position and a closed position;

a claw tine at a distal end of the claw body; and a hydraulic cylinder for moving the claw tine body between the open position and the closed position, the hydraulic cylinder having a fixed end secured to a base and a cylinder rod end secured to the claw tine body, wherein the total angular rotation of the claw tine body between the open position and the closed position is at least 75 degrees.

12. The claw tine of claim 11 wherein the ratio of the length of the hydraulic cylinder when the claw tine body is in the closed position to the distance between the pivot point and the position where the cylinder rod end of the hydraulic cylinder is secured to the claw tine body is in the range of between 0.7 and 0.9.

13. The claw tine of claim 11 wherein the total rotation of the claw tine body between the open position and the closed position is between 75 and 100 degrees.

14. The claw tine of claim 11 wherein the total angular rotation of the claw tine is at least 85 degrees.

15. The claw tine of claim 11 wherein a maximum holding force of the claw tine is positioned between 25 and 40 degrees from the closed position.

5           16. The claw tine according to claim 11 further including a support frame for securing the claw tine to the demolition equipment unit, the support frame including a cylindrical bushing member defining a pivot point for the claw tine body, and at least one support frame plate attached to the bushing member, a locking pin aperture formed in the support frame plate for securing the support frame to the demolition equipment unit and a securing pin aperture formed in the support frame plate for securing a fixed end of the hydraulic cylinder to the support frame, and a support frame receiver attached to the demolition equipment unit, the support frame receiver formed as a single plate having an opening therein for supporting the bushing member and a locking pin aperture aligned with the locking pin aperture of the support frame for securing the support frame to the demolition equipment unit.

10           17. A claw tine for demolition equipment comprising:

5           an elongated claw tine body pivotally movable about a pivot point between an open position and a closed position;

10           a hydraulic cylinder for moving the claw tine body between the open position and the closed position;

15           a support frame for securing the claw tine to the demolition equipment, the support frame including a cylindrical bushing member defining a pivot point for the claw tine body, and at least one support frame plate attached to the bushing member, a locking pin aperture formed in the support frame plate for securing the support frame to the demolition equipment and a securing pin aperture formed in the support frame plate for securing a

fixed end of the hydraulic cylinder to the support frame; and

20 a support frame receiver attached to the demolition equipment, the support frame receiver formed as a single plate having an opening therein for supporting the bushing member and a locking pin aperture aligned with the locking pin aperture of the support frame for securing the support frame to the demolition equipment.

5 18. The claw tine of claim 17 wherein the support frame receiver includes an enlarged portion surrounding the opening supporting the bushing member, wherein the enlarged portion is wider than the adjacent portions of the support frame receiver.

19. The claw tine of claim 17 further including a removable claw tip at a distal end of the claw body.

20. The claw tine of claim 17 wherein the claw tine is adapted to have a total angular rotational value of at least 75 degrees.

21. A method of designing and forming a claw tine for demolition equipment comprising:

- 5 A) developing a general claw tine geometry which defines main geometric parameters of the claw tine;
- B) analyzing the claw tine geometry to determine at least the relative holding force of the general claw tine throughout the range of motion of the general claw tine;
- 10 C) determining the relative value of main geometric parameters of the general claw tine which at least maximizes the holding force of the general claw tine in a desired

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angular rotation of the general claw tine;  
and

D) forming a claw tine having the main geometric parameters determined in step C).

20 22. The method of claim 21 wherein the main geometric parameters of the general claw tine which are analyzed include a lever arm of the claw tine, a total force of the power driving the claw tine, and an angular position between the lever arm and the claw tine.

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23. The method of claim 22 wherein the main geometric parameters of the general claw tine which are analyzed include a relative angular orientation of the lever arm to horizontal, and a vertical distance between a pivot point of the claw tine and the tip of the claw tine.

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24. The method of claim 21 further including the step of analyzing the cycle time of the general claw tine and determining main geometric parameters of the claw tine to minimize cycle time.

25. The method of claim 21 wherein the maximum holding force is set when the claw tine is between about 25 degrees to 40 degrees from the closed position.

26. The method of claim 21 wherein a total angular rotation for the formed claw tine is between about 75 degrees to 100 degrees.

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27. The method of claim 21 wherein the step of determining the relative value of main geometric parameters includes determining a geometric ratio between a length of a retracted hydraulic cylinder powering the claw tine to the distance between the pivot point of the claw tine and a cylinder rod end of the hydraulic cylinder is between 0.70 and 0.90.

28. The method of claim 21 wherein the step of determining the relative value of main geometric parameters includes varying the angular position of the lever arm, the distance between a pivot point of the claw tine and the cylinder rod end, and the angular position of the claw tine.

29. The method of claim 21 wherein the step of determining the relative value of main geometric parameters includes minimizing a vertical distance between an end of a piston rod of a hydraulic cylinder of the claw tine and the tip of the claw tine.

30. The method of claim 21 wherein the step of determining the relative value of main geometric parameters includes maximizing the vertical and horizontal distance between the pivot point of the claw tine and an end of the claw tine.

31. A claw tine for demolition equipment comprising:

an elongated claw tine body pivotally movable about a pivot point between an open position and a closed position;

a claw tine at a distal end of the claw body; and  
a hydraulic cylinder for moving the claw tine body between the open position and the closed position, the hydraulic cylinder having a fixed end secured to a base and a cylinder rod end secured to the claw tine body, wherein a maximum holding force of the claw tine is positioned about one third of the total angular rotation of the claw tine body from the closed position.

32. The claw tine of claim 31 wherein the total angular rotation of the claw tine body between the open position and the closed position is at least 75 degrees.

33. The claw tine of claim 31 wherein the total rotation of the claw tine body between the open position and the closed position is between 75 and 100 degrees.

34. The claw tine of claim 31 wherein the hydraulic cylinder is substantially enclosed by the claw tine body.

*Line A  
separate part  
after claim*